Project STEP-UP
STEM Trends in Enrollment and Persistence for Underrepresented Populations

The Roles Faculty Members Play in STEM Intervention Programs for Underrepresented Undergraduate Students

Introduction

Educators have focused much attention on the obstacles that underrepresented minority undergraduate students in the science, technology, engineering, and mathematics (STEM) fields experience at predominantly white institutions. Although underrepresented students in the math and sciences face ongoing challenges, there are numerous programs targeted toward these students that "aim to initiate undergraduates into research careers through mentoring and hands on research training" (Hurtado, Cabrera, Lin, Arellano, & Espinosa, 2009, p. 2). These intervention programs are designed specifically to increase the participation of underrepresented minority students in STEM fields, as well as to help promote their success in these fields. Such programs are comprised of various components with the end goal of recruiting, retaining, and successfully graduating underrepresented minority undergraduate students in STEM. Effectively garnering and utilizing the support of faculty (i.e. faculty involvement) is one particularly important component (Walker, George-Jackson, Rincon, Williams, Baber, & Trent, 2010). Faculty involvement has been noted to be especially important with respect to students' academic progress including increased academic achievement and retention, as well as educational goals and aspirations (Cole, 2007). Ultimately, faculty members play many roles in intervention programs created to recruit and retain underrepresented groups in the STEM fields; thus, the purpose of this brief is to highlight the key roles of faculty members in intervention programs that specifically target underrepresented students in STEM fields.

Key Themes

Faculty members support the interventions and the students they serve in multiple ways:

- **Academic Support**—Faculty members host students in labs, in addition to serving as mentors for students who participate in these STEM intervention programs. For example, one program administrator stated, "We find faculty to serve as mentors with the research projects, to do all the advertising, the applications, all that kind of stuff, involved in the selection and then during the summer they work in the labs." Faculty members provide students with research experience—helping them write abstracts, develop research proposals, and allowing opportunities for them to present their research to others in the field.

- **Financial Support**—Faculty members write grants, so that students who participate in these intervention programs are funded. They write proposals in order to receive money for conferences, equipment, and other resources students may need. For example, during the interview process one administrator expressed that faculty members "need to be writing lots of proposals. [They] need to be getting lots of money in order to be getting at least four students supported. And then [they] need to have equipment for them and things for them

to do and money to go to conferences. [Faculty members] need to have a pretty large research budget."

- **Outreach and Recruitment**—Faculty members engage with schools. One program administrator stated, "So we're doing visitations with those schools. We have faculty members who go out and take experiments out to these schools." Faculty members speak to students in high school, as well as postsecondary schools, about the math and sciences and bring resources to schools when participating in outreach. They also participate in the recruitment and selection process of students for the interventions. For example, according to one program administrator interviewed, "You give [faculty members] the pool of applicants, you know, short list, and then they select out of that and read their personal statements and research interests and then they'll select their students."

Discussions for Future Research

A common recurring theme in the data indicated that some faculty members were supportive and involved in these intervention programs, while others were not as supportive. For example, one program administrator stated, "We have many faculty that have certain expectations and assumptions about our students. And that can be an obstacle, but on the other hand, they can be advocates. So, I can't generalize, but I've had some very positive interactions with faculty. I've heard of some challenges. There are specific faculty that are very involved with some of the things that we want to do, and I'm happy to participate with the idea sharing there."

Much of the literature that discusses STEM intervention programs focuses on the importance of faculty members and their involvement with these interventions. According to Hurtado et al. (2010), faculty members contribute to students overall development of their science identities (p. 10). So, the more involved faculty members are in these intervention programs, the more students will have the opportunity to develop their own identity in the math and sciences. It is important that future studies thoroughly examine the levels of faculty involvement in STEM intervention programs. In addition, research on faculty roles and STEM intervention programs should inform educators about the impact that low faculty support has on underrepresented students in STEM intervention programs.

Conclusion

The roles that faculty members play in STEM intervention programs include supporting students academically, providing students with financial support, and participating in outreach and recruitment. Research supports the idea that faculty members have a significant impact on how students see themselves (Hurtado, 2007). Positive interactions with faculty members encourage students to succeed at their full potential (Cole, 2007). Further, faculty involvement is pivotal for underrepresented students' academic and social success in STEM. According to Hurtado (2007), faculty members best demonstrate their support for underrepresented students' academic and social success by providing students with advice and criticism and establishing formal and informal mentoring relationships with them.

References

Cole, D. (2007). Do interracial interactions matter? An examination of student-faculty contact and intellectual self-concept. Journal of Higher Education, 78(3), 249-281.

Hurtado, S., Cabrera, N. L., Lin, M. H., Arellano, L., & Espinosa, L. L. (2009). Diversifying science: Underrepresented student experiences in structured research programs. Research in Higher Education, 50(2), 189-214.

Hurtado, S., Newman, C. B., Tran, M. C., & Chang, M. J. (2010). Improving the rate of success for underrepresented racial minorities in STEM fields: Insights from a national project. New Directions for Institutional Research, (148), 5-15.

Walker, K., George-Jackson, C. E., Rincon, B., Williams, M., Baber, L., & Trent, W. (2010, November). STEM intervention programs: The shift from opportunity to merit. In Association of the Study of Higher Education Conference Paper. Indianapolis, Indiana.

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About the Author

Lynneah Ciera Brown is a Graduate Research Assistant with Project STEP-UP and Master's student in the Department of Education Policy, Organization & Leadership (EPOL) at the University of Illinois at Urbana-Champaign. Her email address is lcbrown3@illinois.edu.

Project STEP-UP
http://stepup.education.illinois.edu/
University of Illinois at Urbana-Champaign
1310. South Sixth Street, MC 708
Champaign, IL 61820
217.244.5274

Principal Investigators

William Trent, Ph.D. (PI)

Lorenzo Baber, Ph.D. (Co-PI)